



# CHEETAL

JOURNAL OF

**The Wildlife Preservation Society of India**

Vol. 29

April, 1988

No. 2

Photo by—Ashish Chandola





# CONTENTS

---

|                                                                                                                                                        | Page |
|--------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| 1. Straying An Abnormal Behaviour of Mating Tigers of Sundarban<br>by Arin Ghosh and N. Mandal                                                         | 1    |
| 2. Some Rare Ornithological Records from Sibsagar, Assam by<br>Anwaruddin Choudhary                                                                    | 5    |
| 3. Nilgai, <i>Boselaphus tragocamelus</i> — A serious crop pest between Jodhpur<br>and Osian (Rajasthan) by Dr. Lal Singh Rajpurohit                   | 10   |
| 4. Cattle Threat to Protected Areas by H.S. Pabla                                                                                                      | 14   |
| 5. Population Dynamics of Elephants ( <i>Elephas maximus maximus</i><br>Linn.) in Palamau Tiger Reserve, Betla, Bihar by D.S. Srivastava               | 19   |
| 6. International Trade On Wild Indian Plants by S.K. Mukherjee                                                                                         | 29   |
| 7. On <i>Vanessa cashmirensis</i> Kollar (Lepidoptera : Nymphalidae):<br>Wings collected from under a stone in Almora District (U.P.)<br>by G.S. Arora | 32   |
| 8. Threatened Wildlife of Orissa by S.C. Nahar and A. Mohapatra                                                                                        | 35   |

---



# CHEETAL

## Journal of the Wildlife Preservation Society of India

Vol. XXIX

April 1988, Dehra Dun

No. 2

### Straying An Abnormal Behaviour of Mating Tigers of Sundarban

Arin Ghosh, I.F.S.

*Field Director, Sundarban Tiger Reserve*

and

N. Mandal

*Research Officer, Sundarban Tiger Reserve*

#### Introduction

Straying from the Reserve Forest, the natural habitat, to the adjoining villages during the night time and killing the cattle is an abnormal behaviour shown by some of the tigers of Sundarban. Here, there is no definite seasonal dependance or periodicity of tiger straying into the villages. In certain instance it killed much more than it could consume. Whilst Sundarban tigers are notorious for their attack on human being, during it straying to the villages there has been no case of human killing for during the last 7 years.

#### Observations

One adult male tiger was observed around the Sajnakhali complex in Pirkhali-1 Compt. (Diagram) during the 2nd week of May '88. On night of 9th May this male strayed to the nearby village Pakhiralaya and killed one Cow and a goat. It moved inside the village nearly 4 km and returned back to its habitat without consuming the kill. To prevent further straying, night patrolling along the forest fringe with flame torches and crackers were organised. To capture the straying tiger a wooden trap (9' x 4' x 4') was placed inside the Reserve Forest at Sajnakhali. Two pigs, one inside the trap and other outside was given as baits. The tiger did not approach near the trap. Instead, on 12th May it strayed into the village Jamespur and injured one Cow and killed two goats. It neither moved towards the trap nor strayed in the villages for the next 18 days. On 30th May



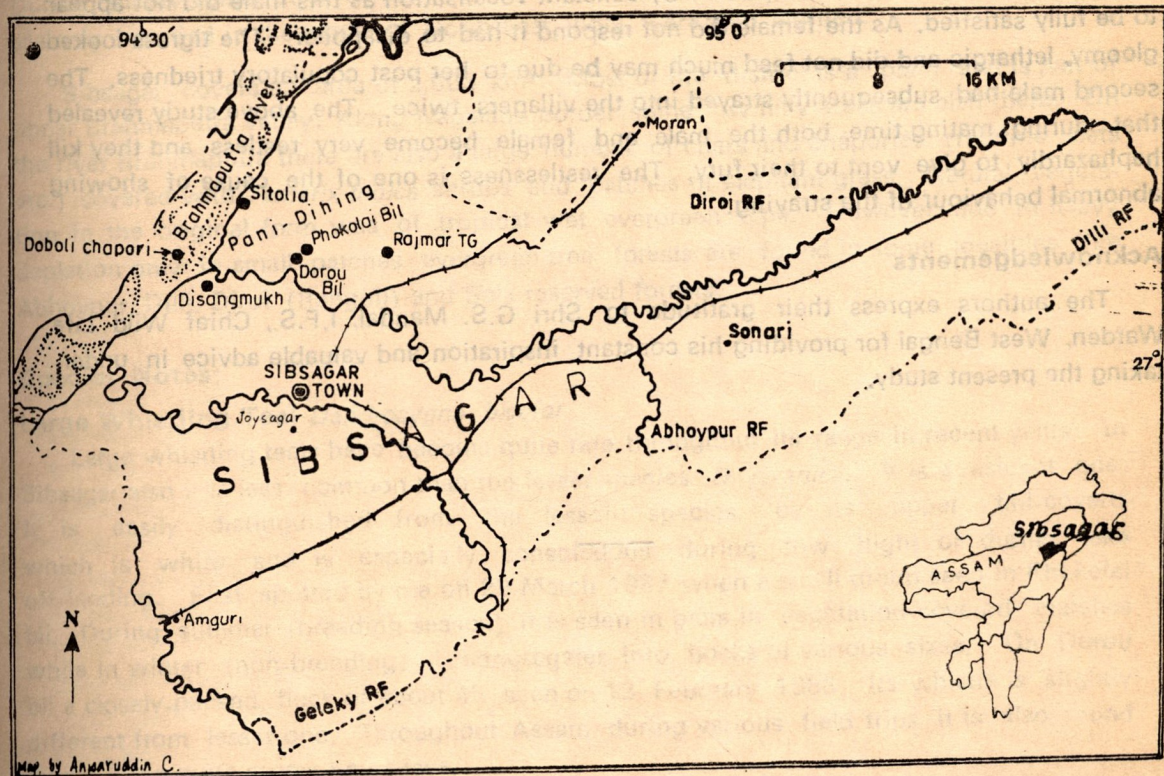
the outer bait was taken away by this tiger but it did not enter the trap to collect the 2nd bait. For the next 25 days it could not be traced. On 25th June it again strayed into the village Dayapur and killed 2 goats and one sheep.

Movement of one female tiger was observed along with this male during the last week of June '88. Evidence of copulation was recorded in Sajnakhali on 27th June. On 29th June the straying male was trapped inside the cage. It was translocated and released at Chamta-5, on 30th June '88. During the 1st week of July the female tiger was observed to move around the Pirkhali-1, Panchamukhani-2, and then shifted to Jhilla-4. On 9th July '88 the female strayed into the village Lahiripur killed one dog. It again returned to Panchamukhani-2, and Pirkhali-1, her previous habitat. After a week the female again strayed on 17th to the village Dayapur and killed 4 goats and one dog. As the tigress was disturbing the normal village life, following its pathway, two traps—one at Sajnakhali and other at Panchamukhani-2 were placed. On 20th the female took the outer bait of Sajnakhali trap but it did not enter the trap. On 25th the female again strayed into the village Dayapur and killed 4 goats and one dog. Only one of the goat was taken by the tigress to the reserve forest. On 26th night this tigress was trapped in the cage of Panchamukhani-2. The trapped tigress was transferred to a translocating cage on 27th and it was brought to Sudhanyakhali tower location (Diagram) in the afternoon. When the tigress was inside the covered cage on a boat at about 4.45 p.m., it growled twice. It was observed that, hearing the growl of the female, one male tiger responded to her and continued the mating call for a long period. This male tiger was sighted from the observatory tower for about an hour. The male came near the bank of the river and called very frequently. It was showing restlessness looked all around and was busy searching the female with continuous calls. At 5.30 p.m. it moved inside the dense forest with angry vocal signals. In the evening, when the boat carrying the female was shifted to a little distance the male tiger followed along the river bank with continuous calls. The male followed the boat upto 7.30 p.m. As the female did not respond any more the male stopped calling and disappeared. On 28th morning the female was translocated to Chamta-8 and released. The female was very healthy with beautiful bright colouration but on the way of translocation it looked gloomy and lethargic. Though sufficient raw meat and water was given, it ate very little of it.

## Discussion

The observations revealed that, the captured female had close alliance with the male which was straying (aberration because of sexual urge). It was captured on 29th June '88. The female was in oestrus at the time when the male was captured. As the male was trapped and translocated to far off distance, she did not find him to copulate any more.







So the female was agitated and it moved all around and shifted herself to Jhilla-4 but it again returned to her own habitat Pirkhali-1 and Panchamukhani-2, after a few days. By this time she had chosen her new mate (Sudhanyakhali tiger) but the tigress was very restless and she strayed to the villages and killed many more cattle. The female selected her second mate during the 3rd week of July and it successfully copulated with her new partner. It is presumed that the trapped female achieved satisfaction from the second male and the fertilization was complete when trapped. As the fertilization was over it did not respond the calls of her partner any more. This second male was too much restless and tried to find out and follow his partner by constant vocalisation as this male did not appear to be fully satisfied. As the female did not respond it had to disappear. The tigress looked gloomy, lethargic and did not feed much may be due to her post copulatory tiredness. The second male had subsequently strayed into the villagers twice. The above study revealed that, during mating time both the male and female become very restless and they kill haphazardly to give vent to their fury. The restlessness is one of the cause of showing abnormal behaviour of the straying.

### Acknowledgements

The authors express their gratitude to Shri G.S. Mandal, I.F.S., Chief Wild Life Warden, West Bengal for providing his constant inspiration and valuable advice in undertaking the present study.

---



## Some Rare Ornithological Records From Sibsagar, Assam

Anwaruddin Choudhury

Sibsagar is a district of eastern Indian state of Assam. During a stay of about nine months between March 1987 and February 1988 I made a bird survey of the district. During survey some birds which were hitherto unrecorded in the district or were very scarcely recorded in the whole of North-East India, were also sighted.

Sibsagar covers an area of 2,603 km<sup>2</sup>. Most of the district is a plain and is part of upper Brahmaputra valley. Along Nagaland border some low hilly areas are also there. On the river Brahmaputra there are also a large number of chars and chapories (riverine islets etc.) covered with *Tamarix dioica* shrubs and patches of elephant grass. Natural vegetation in the original form was of tropical wet evergreen type. However due to heavy depletion only in small patches evergreen tree forests are found in some localities like Abhoypur, Dilli, Diroi (Rangoli) and Sola reserved forests.

### Species Notes:

#### Large Whistling Teal *Dendrocygna bicolor*

Large whistling teals have become quite rare throughout its range in recent years. In Sibsagar also it is less common than the lesser species *D. javanica*. It is a resident one. It is easily distinguished from the lesser species by its upper tail-coverts which is white and is especially conspicuous during low flight or during take off/landing. First spotted by me on 29 March 1987 when a small group seen in Phokolai bil. During summer (breeding season) it is seen in pairs in vegetation-covered marshes while in winter (non-breeding) it congregates into flocks of various sizes. On Dorou bil a closely-packed flock of about 45 seen on 13 February 1988. Its whistle is slightly different from lesser one. Throughout Assam during various field trips it is also found by me to be quite scarce nowadays.

#### Common Pochard *Aythya ferina*

A winter visitor. Earlier recorded as a sparse species in Assam (Handbook, vol. 1). But in Sibsagar it appeared to be quite common. On Sibsagar tank (a historic tank in the heart of the Sibsagar town) it is very common during winter. Arrives in late October and mostly gone by March-end. First arrivals seen on Sibsagar tank on 27 October 1987, while the last bird of the preceding winter was seen on 3 April 1987. It prefers the grassy edges



of the tank. Seen in pairs, small parties and in groups of about 30+. Sometimes unisexual groups also seen. Along with spotbill *Anas poecilorhyncha* it is the most familiar duck of Sibsagar tank. It was also seen on other historic tanks like Joysagar and Rudrasagar. However it is rarely seen in natural lakes, bils etc.

#### **White-Eyed Pochard or Ferruginous Duck** *Aythya nyroca*

A rare winter visitor. Seen in Phokolai and Dorou bils, and few on Sibsagar tank also. First confirmed sighting was on 13 February 1988 in Phokolai bil, when 5 birds observed from very close. On the same day another group of 9 ducks seen on nearby Doroubil. Largest flock seen was of about 20 birds in Phokolai bil on 29 November 1987.

#### **Baer's Pochard or Eastern White Eye** *Aythya baeri*

A very rare winter visitor. Only one probable sighting. About 7 ducks observed on Sibsagar tank on 8 February 1988 amidst a thousand other ducks. Not seen elsewhere.

#### **Griffon Vulture** *Gyps fulvus*

##### **Himalayan Griffon Vulture** *G. himalayensis*

As per available records, it is a straggler in western Assam (Handbook, Vol. 1). Sibsagar being in far eastern Assam its occurrence needs cautious treatment. First on 30 September 1987 I saw an enormous vulture amidst a mixed group of white-backed and longbilled vultures near Rajmai tea garden. Since I was on a speeding, I quickly recorded its size and colour: above—light brown; below—white. Then on 23 January 1988, 2 vultures seen perched very close on top of a simul tree (*Salmalia malabarica*). One was a normal-sized longbilled vulture (*G. indicus*), but the other one was much larger. On closer observation with a 20× binocular the following facts revealed: head—white; above—bright chocolate-brown; lower back—brown; below—brown. Again on way to Disangmukh on 2 February 1988 a large vulture seen perched on the top canopy of a simul tree basking in the morning sun. On the same day 2 more large vultures seen in flight over Doboli chapori area and a further one between Disangmukh and Sibsagar. Nine large vultures seen in flight over Doboli chapori on 7 February 1988. In all the cases the enormous size in relation to commoner species and overall colouration confirms them to be either *G. fulvus* or Himalayan species of *G. himalayensis*. But latter being a purely mountain bird (Handbook, vol. 1) is less likely to be present. The bird sighted on 23 January 1988 with characteristics recorded appeared to be a *G. fulvus*, first record in eastern Assam. However, the one sighted on 30 September 1987 near Rajmai tea garden might well be a stray case of *G. himalayensis*. There are also instances when other mountain birds like cinereous vulture (*Aegypius monachus*) were recorded in the plains of Assam (Choudhury 1986).



### Eastern Marsh or Striped Harrier *Circus aeruginosus*

Only records in North-East India were from Cachar and Manipur (Handbook, vol. 1). Apparently a very rare winter visitor. For Sibsagar as well as the whole Brahmaputra valley of Assam this is the first record. A ♂ seen only once in flight over Doboli chapori off Disangmukh on 7 February 1988. Once sighted in flight it can be easily identified by blackish head, white underparts with black stripes/streaks on nape, throat and upper breast.

### Common Crane *Grus grus*

A very rare winter visitor, recorded only as a straggler. The earlier stray records in Assam were from Lakhimpur and Cachar. I was on a routine bird survey in the chapori areas of Brahmaputra off Disangmukh when 9 cranes caught my attention. Time was 9.45 a.m., on 2 February 1988, location was Doboli chapori. The birds were seen walking and feeding on ground with occasional trumpeting "krook-krook". The area was a sandy chapori with short grass and jhau shrubs (*Tamarix dioica*). They were very much alert, and at my very sight they vanished. Few immatures were also there, which were brownish-grey and lacked the white areas in head and neck. However at 10.35 a.m. the cranes suddenly took to flight when I could count the whole group, there were 15 birds altogether. I again surveyed the same locality on 7 February 1988 but did not see any cranes.

### Singing Bush Lark *Mirafra javanica*

According to Handbook, vol. 5, *M. javanica* is absent in Assam and it is the *M. assamica* that is found in Assam. However, on 2 January 1988 I saw two birds, may be a pair between Sitolia and Disangmukh on ground with short grasses. The location was on the banks of Brahmaputra river and the time was 2.45 p.m. The birds were of sparrow-size with rufous on the wings. Underparts light yellowish-brown. But the streaks were observed in throat area only (contra, breast in Handbook, vol. 5). But the proportionately large bill of *M. assamica* put me in no trouble that it was not the bird which I saw.

### Bank Myna *Acridotheres ginginianus*

Bank myna was an unknown bird in North-East India. According to Handbook, vol. 5, Bengal is their eastern limit of distribution. However sometimes in 1984-85 I saw a flock at Guwahati, capital city of Assam and the latest edition of 'Synopsis of birds of India and Pakistan' (Ripley 1982) also recorded it as present in Kamrup district (Guwahati is also in this district) of Assam. Later of course I discovered a small permanent population in Dispur area of Guwahati city. But east of Guwahati, especially in far eastern areas



like upper Assam it was still unknown till I found a small population in Pani-Dihing and adjoining areas of Sibsagar district. First sighting was on 25 October 1987 (incidentally my 29th birthday), then sighted on almost every visit to Pani-Dihing area. Also sighted outside, but adjacent to Pani-Dihing area. Not seen in other parts of Sibsagar. An interesting feature is that in all the sighting localities they were seen near wetlands, thus it seems that they are partial to wet areas in Sibsagar. They also stay away from human habitations (contra. other parts of India).

### **Orangebilled Jungle Myna *Acridotheres javanicus***

Not recorded previously in Sibsagar or in other parts of Brahmaputra valley districts. In nearby Nagaland its existence was known (Handbook, vol 5). Although I noticed many deep black mynas with orange-yellow bill and long tuft of feathers near forehead, the first authentically identified on 14 February 1988 when a pair seen on a middle sized simul tree near Dak Bungalow in Sibsagar town. During flowering season of simul (especially in February) they are quite common in association with other mynas, bulbuls etc., but are usually met with in pairs.

### **Large Pied Wagtail *Motacilla maderaspatensis***

Quite common especially in the vicinity of water. It is larger than other wagtails. Seen mostly singly, sometimes in pairs. But I was a bit surprised to find that its probable eastern limit of distribution are in Bengal duar, lower Bengal and adjoining parts of Bangladesh (Handbook, vol. 9). In my all the visits to Pani-Dihing area and Brahmaputra river front especially between October 1987 and February 1988 it was commonly seen.

### **Discussion:**

Sighting of these above discussed birds were quite significant, as some were recorded for the first time while some others are very scarce. Pani-Dihing area alongwith adjoining chapories of Brahmaputra and the Phokolai-Dorou bils are home to a large number of wintering water fowls. A more detailed survey may reveal presence of many other rare and unrecorded birds. A part of the area has been proposed as a bird sanctuary but so far no positive steps have been taken by the Government in this regard. However in any bird sanctuary the bird-rich Phokolai-Dorou bils should be included. The declaration of the area as a sanctuary will also check the present spree of poaching, especially during winter.

### **Acknowledgements:**

I offer my thanks for their help during various field trips to Mr. Prabhat Yien, Puran Das, Dharmeswar Das, Officers and drivers of D. C.'s establishment, local residents of Disangmukh area, Milonkur among others.



## References:

- Ali Salim and Ripley, S. Dillon. 1968-74. Handbook of the Birds of India and Pakistan, 10 vols. Oxford Univ. Press, Bombay.
- Choudhury, Anwaruddin. 1986. Occurrence of Cinereous vulture in the lower altitudes in Assam, India. Tigerpaper. XIII (2): 32-33. F.A.O., Bangkok.
- Ripley, S. Dillon. 1982. A synopsis of the Birds of India and Pakistan, Bombay Nat. hist. Soc., Bombay.



# Nilgai, *Boselaphus tragocamelus* – a serious crop pest between Jodhuur and Osian (Rajasthan)

Dr. Lal Singh Rajpurohit

Department of Zoology, University of Jodhpur, Jodhpur - 342001 (India)

## Introduction

Nilgai, *Boselaphus tragocamelus* is the largest and a common antelope found in open scrubs where little vegetation exists and in and around wild life sanctuaries in Rajasthan (Roonwal, 1983). This wild animal raids the crops occasionally and is very shy of human beings (Prater, 1980 and Majupuria, 1982). Due to deforestation and increase in the area of agricultural fields disturbing ecological balance, it has become a serious pest of the crops around Jodhpur (Prakash, 1986; Rajpurohit and Mohnot, 1988; Ghosh *et al.*, 1988) and also compete for resource utilization with domestic ungulates like goat (*Capra hircus*) and sheep (*Ovis orientalis*) (Ghosh *et al.*, 1987). The nilgai is exclusively indigenous and distributed from foot hills of the Himalayas in the north to Mysore in the south (Majupuria, 1982). It is a very fast moving animal and can run at a speed of about 60km/hr and jump easily six to seven feet high stone wall or fencing. Nilgai enjoys complete immunity being regarded as a near relative of the cow which is considered a sacred animal amongst the Hindus. The fast movement also helps it to escape (Rajpurohit and Mohnot, 1988). It is a protected wild animal under the Wild Life Act, 1972. But since last five years or more as seen around Jodhpur, farmers want to get rid of this pest because it accounts for losses of about 25 to 30% of total yield.

These animals live in two types of herds or as solitary, a bisexual herd has 4 to 15 individuals of both sexes and of all age classes and the all-bull herds may comprise 2-5 adults and young adult males. Generally there is a single adult bull in a bisexual herd who leads the group but sometimes two or more bulls are also observed in one bisexual herd. Adult and leader bull of bisexual herd have been observed fighting with a solitary bull or all-bullherd males for territories (Rajpurohit and Mohnot, 1988). The bulls have been observed shifting from one area to other, depending upon the availability of crops.

This paper is about a preliminary survey based on the observations and questionnaires from farmers of different villages between Jodhpur and Osian (60 km north to Jodhpur



city) made in February-March 1988. The villages are Keru, Daijar, Manaklao, Rampura, Manai, Chopasani, Mathania, Ummednagar, Bhanser, Kiramsaria, Anwara, Danwra, Neora, Tinvri, Gheora and Daikara. The entire population of Nilgai could not be counted but it is about 2-3 animals per sq km as observed around Jodhpur (Rajpurohit and Mohnot, 1988). The population density is not much but since last 5-10 years people have destroyed the forest and made most of the wasteland and agricultural land. So there is no place for these antelopes except roaming around the crop fields, and people say nilgai population have increased. It may also be a fact because no predator has been left in this area. It definitely needs complete scientific survey and ecobehavioral research.

### Common crops of the area

In this semi-desert and open scrub region of about 1200 sq km north of Jodhpur, 60% fields have both the crops 'Rabi' and 'Kharif'; 30% have only 'Kharif' and rest 10% is wasteland or hills. The water level varies from one subregion to another, but on an average it is 120-200 feet deep, of course since last 3-4 years there has been a lack of sufficient water due to little or no rain. The common Kharif crops (grown in July-August, depending upon monsoon) are : Bajara (*Pennisetum typhoidenum*), Jowar (*Sorghum vulgare*), Maize (*Zea mays*), Gwar (*Cyamopsis tetragonoloba*), Mung (*Phaseolus aureus*), Moth (*P. aconitifolius*), Til (*Sesamum orientale*), Castor (*Ricinus communis*) and Kapas (*Gossypium* sp.). On the other hand Rabi crops (grown in Nov. and Dec. which are irrigated) are : Wheat (*Triticum vulgare*), Chana (*Cicer arietenum*), Saranso (*Brassica campestris*), Rai (*B. juncea*), Piaz (*Allium cepa*), Garlic (*A. sativum*), Chilies (*Capsicum annum*), Dhania (*Coriandrum sativum*), Jeera (*Carum nigrum*), Sounf (*Foeniculum vulgare*), Potato (*Solanum tuberosum*), Tomato (*S. esculantum*), Brinjal (*S. melogena*), Bhindi (*Hibiscus esculentis*), Mooli (*Raphanus sativus*), Carrot (*Daucus carota*), Gobhi (*Brassica aleracea*), Methi (*Trigonella foenum*), Matar (*Pisum sativum*), Palak (*Spinacea oleracea*), and Shakerkand (*Ipomea botatas*).

### Crop raiding

Nilgai is herbivorous and it browses on shrubs and small trees and also grazes on grasses and herbs (for detail see Rajpurohit and Mohnot, 1988). In addition to this it often raids the crops, jumping across 6-7 feet high stone wall or fencing made to protect the crop from wild and domestic crop raiders. Mostly it raids the fields early in the morning, evening and at night. It may raid as solitary bull, duo bulls or cows and in a herd of about 4-15 individuals of all the age classes. It is observed round the year around Rabi crop fields and only in August–October near the Kharif crops. The farmers of Rabi crops say that population density of this pest remains the same round the year, but in actual it decreases in Kharif crop season as some of these animals shift towards other fields where only Kharif



crops are grown. It is quite possible because at Osian (my village) I have observed nilgai, frequently in August—October (Kharif crop season) since last 5-6 years and in dry season it is not seen nearby.

While raiding there is no preference to particular crop but it is observed avoiding Chilies (*Capsicum annum*) and Raira (*Brassica juncea*). Farmers say that nilgai spoils the crops more than it feed as all the vegetable crops are delicious. They say that it totally depends on their crops as they are observed lying under trees in day time and whenever they get an opportunity to enter into crop fields they will do so. But observation suggests that it also feeds in all the available vegetations outside the crop fields. Of course in dry season they raid more frequently as there is nothing to eat outside the irrigated fields.

The animal is very shy but cows are seen to be aggressive when their calves were disturbed by any other species like dogs, and other domestic ungulates. They can be chased away while crop raiding by a small boy or girl carrying a stick with a dog. Farmers also use tractors to chase away by making loud sounds using crackers and air guns. They never shoot it because of their religious sentiments and fear of the Forest Department as it is in the list of Protected Wild animals. But there is an information from village Manaklao that one bull nilgai was shot dead in December 1987 by a farmer and another was injured which also died later. The skin of a bull nilgai is very hard and a bullet can hit only if it comes at right angle otherwise it would easily slip away giving no injury. Now they do not flow an electricity current in fencing wire to protect this pest since one man (farmer himself) died due to electrocution while irrigating because the current flowing in fencing wire entered into open water somewhere.

On the other hand, I have some information from this study about rechasing by nilgai of chasers. Three interesting cases of rechasing of man by a bull nilgai while chasing away : in 1986 at village Daikara (40 km north-east to Jodhpur), a man was injured by hitting and biting of a bull nilgai who died just after few hours of attack; in another case of village Anwana (50 km north of Jodhpur and 20 km south-east to Osian), a man named Binjo Saran severely injured by a bull and escaped after hiding himself in a bush Kankaro (*Maytenus emerginata*) in 1987; and in one more case at village Saluri-Keru, a man also was injured while chasing a bull nilgai in 1987. In all the above cases adult men were the victims. Generally one or two men have to look after the crops from attacks of this animal the whole night.

Except nilgai, there are some other wild mammalian pests of crops in this area, e.g. Chinkara (*Gazelle gazelle*), Blackbuck (*Antelope cervicapra*), Hare (*Lepus ruficandatus*), and Procupine (*Hystrix indica*), but not many as nilgai. Black buck and chinkara are



observed in large herds at Guda Bishnoiya (24 km south to Jodhpur) and Dhava-Doli (42 km south-west to Jodhpur).

### Can it be Pet ?

Nilgai can be tamed from birth but it is very difficult to get change its habits. At Mandore Gowshala near Jodhpur, a male nilgai calf was kept with cow calves when it was a few days old. In January 1988 it was about two years old, escaped out and ran away. Before that it usually fed alongwith calves inside the cowsheds and was not shy. Prater (1982) and Frank (1929) stated that nilgai as an antelope in India could be turned to any useful purpose. I also have similar ideas that bulls could be turned to use for carts, ploughing and also for riding.

### Conclusion

There is no doubt that nilgai is a serious pest in this area, but the species need complete survey and ecobehavioral studies to take any step. At the moment wherever there is a severe problem of this animal, it can be translocated to similar habitats where they are less or not found or to the wildlife sanctuaries.

### Acknowledgement

I am grateful to Dr. S. M. Mohnot, Department of Zoology, University of Jodhpur for guiding this study. The thanks also go to H.S. Bhati, Sh. Tyagijee and Shashi Benjee for support in transport for field work and to many farmers for giving useful information.

### References

- Frank, F. 1929. Sterndale's Mammals of India. Colour Craftman Press, Bangkok (p.229).
- Ghosh, P.K., Goyal, S.P. and Bhora, H.C. 1987. Competition for resource utilization between wild and domestic ungulates in the Rajasthan desert. Tiger Paper, XV(1): 2-7.
- Ghosh, P.K., Bhora, H.C. and Goyal, S.P. 1988. Crop raiding by Nilgai (in press).
- Majupuria, T.C. 1982. Wild is beautiful: Introduction to the Magnificent Rich and Varied Fauna and Wildlife of Nepal. Thacker Spink & Co., Calcutta.
- Prakash, I. 1986. Wildlife resources and its management. In Desert Environment: Conservation and Management. (Ed. by K.A. Shankernarayan and Vinod Shanker) Central Arid Zone Research Institute, Jodhpur (p.19-22).
- Prater, S.H. 1980. The Book of Indian Animals. Bombay Natural History Society.
- Rajpurohit, L.S. and Mohnot, S.M. 1988. Field observations on Nilgai, *Boselaphus tragocamelus* around Jodhpur. Tiger Paper, XV (3) (in press).
- Roonwal, M.L. 1983. Fauna of the great Indian Desert. In Desert Resources and Tecnology. Vol. 1 :-86 (Ed by Alam Singh), Jodhpur Scientific Publishers.



## Cattle Threat To Protected Areas

By

H.S. Pabla, I.F.S.

Our forests which serve as the habitat for countless species of wildlife both at the micro and macro levels are being destroyed by three major human influences, namely, overgrazing, overfelling and fires. Out of these three destructive forces, foresters and wildlife managers, in India, rate overgrazing as the most potent because apart from other things, it is most difficult to control.

To put the problem in correct perspective it is necessary to deliberate on its magnitude, its destructive potential, reasons for its being virtually uncontrollable, and, despite this, find a workable solution. For reasons of space, I will discuss these facets of the malady only briefly, with illustrations from Panna National Park of M.P.

By law, grazing in a national park is totally prohibited while in sanctuaries it is permitted only as far as it does not adversely affect the interest of wildlife. But a law is only as good as it is enforced. There are enormous problems in implementing grazing regulations mainly because the affected people are the rural poor, the cattle are not necessarily within the control of the owner and moreover, it is difficult to convince people and authorities that even grazing can destroy our forests. "After all cattle eat only grass not trees" they say. The problem is further complicated in areas where only the first notification of intention has been issued to make it a National Park. In such areas, legal controls under the Wildlife Act are not available and the manager has to depend on the Indian Forest Act for controlling grazing and these provisions are not adequate to protect the area of a prospective park. As a result in most sanctuaries and new national parks control on grazing is the major concern of the authorities and consumes most of their time, energy and funds.

Almost fifty four percent of the 7200 sq. km of the geographical area of Panna District is under dry, rocky, low productivity, low density forests. This area supports (as per 1981 census) more than 5,00,000 human being and 7,75,000 cattle heads in addition to goats and sheep. All the districts, surrounding Panna are seriously deficient in forests and their demands for forests produce are largely met from Panna both legally and illegally. In this Bundelkhand belt cattle are kept in cattle camps deep inside forests from July to March. Villages are scattered all over the forests and cattle from villages which are located far away from the forests stay either inside the former or in camps located still deeper. Cattle even from adjoining districts camp in Panna forests. The agricultural fodder



mainly wheat felt (Bhusa) is exported in large quantities instead of feeding it to their own cattle. This means, ignoring the pressure from adjoining districts, the fodder requirement for almost the entire cattle population is met from the forests. This further means that every hectare of forest land is burdened with two heads of cattle, whatever its productivity be. As the areas later included in the intended national park were more productive and hence attractive, the grazing pressure on that tract was much more than the average. Even ignoring the extra pressure, the 548 square kilometres of the prospective national park were supporting at least 1,00,000 heads of cattle at the above rate.

As pointed out earlier, Panna is a Dry Deciduous (Very Dry Teak) forest. Although it receives 50 inches of annual rainfall yet because of shallow and compact soils, the water does not percolate much into the soil. And in such heavily overgrazed landscape with no obstructions to break the momentum of running water, wheat erosion further destroys its capacity to produce woody biomass. Under the impact of over use, sheet erosion, compaction and annual fires grasses and weeds are the only soil binders that hold on. These perennial grasses, recover very fast if their metabolic reserved are still intact. And given a chance to recover, by simply reducing overgrazing, a single Monsoon can transform the looks of a forest from a shattered ecosystem to one still throbbing with vitality and life.

This is what exactly happened in Panna. We took up the park for management in December '82 and started preparing for a war on grazing during the coming rains. I was convinced that if we won this war it would make things easier later and if we failed, the defeat would be permanent. So between December '82 and June '83 we studied the problem minutely and weighed the various possibilities and prepared our staff psychologically, convincing them that overgrazing was the most important enemy of our forests and must be controlled before anything else. We examined the problem from the angle of number of cattle; the extent of grazing land required for the cattle of a particular village, which villages had sufficient pastures outside the park and which did not; and which village needed grazing facility inside the proposed park and which did not. From this analysis, we decided that as long as the national park was not finally notified, the villages located inside the proposed boundaries were to be given as much grazing land as they genuinely required. Similarly, villages located outside the boundaries but, not far off, were grouped into two categories those with sufficient land outside the park and those which did not have sufficient grazing land outside the park boundaries; out of these, the former were not given any grazing land while the latter were to be permitted to graze in an earmarked area the size of which depended on by how much they were short. All cattle camps were to be prohibited.



On the basis of these broad principles, suitable forest compartments generally bounded by natural boundaries were earmarked for each village (at the rate of one hectare per two cattle head) and grazing in all unallotted areas was prohibited. A crude sort of rotation was exercised in that whenever people from a particular village complained of shortage of fodder in their area, the area was changed. The areas were generally decided in consultation with the villages with the assurance that if they had any genuine problem later, their area could be increased or changed. Simultaneously, a rigorous drive was launched to impound cattle grazing either illicitly or in closed areas and the owners were punished under law.

With these steps, the grazing pressure came down to 21,000 cattle heads grazing over approximately 11000 hectares of forests. This reduction in grazing pressure set the recovery process in motion at such a fast pace and it was difficult to believe that the sprawling grasslands were, till a few months ago, bare rock with loose boulders strown all over the shallow, naked compact and burnt soils.

In a nutshell, the entire operation was based on two things i.e. allotting adequate grazing land to the villages which were bonafide dependent on park and strict action against those who contravened the rules. At the same time there was regular communication with the villagers to convince them that this system was necessary to save 'their forest'. Now because more fodder was available for those who were permitted to graze, all the suspicions evaporated and people really became our friends except those who were prohibited. Within a year of its existence the park became well known for its grazing management.

But this was only a short term and very personalised solution. This is because the moment you stop communication with the concerned people and step being strict with law breakers, the system would crumble. Although it is difficult to run any organisation without motivated people but a long term solution to our grazing problem would naturally consist of two pronged action i.e. reduction in cattle population and produce as much non forest fodder as possible. A reduction in cattle population is not difficult if all the scrub bulls are castrated and at the same time a large number of artificial insemination centres are opened in rural areas. In most areas with easy access to forests, such as Panna, not all the cattle are kept for economic gain. Most cattle are there because the cows keep breeding and feeding in the forests without the owner having to care for them. These cattle go to the traditional grazing land on their own every morning and come back in the evening and spend the nights standing either on the roads or on some other village common lands. Most of the wet cows are never milked and the only gain the owner obtains in the male calves either for their own use or for sale. This gain is almost negligible when compared with the damage these large herds do to our fragile ecosystems.



Now if a grazing area is specified for each village, these semiferall cattle will be prone to grazing in closed areas if not personally attended to by the owner. This will entail payment of fines, impoundment fees, compounding fees and even prosecution. Under such circumstances, these become a liability for the owner and he will be compelled to dispose of them and would keep only as many cattle as he can easily feed and control. If these residual cattle are of an improved quality with higher milk yield and breed faster than the fallow stock, this reduction will prove a boon for the peasant. This is where castration and artificial insemination would play a key role.

The second aspect of the long term solution is production of more fodder preferably outside the forests so that the remaining cattle stock can be fed within the confines of their houses. There is plenty of fallow land available in the villages, both Govt. and privately owned which can be put to this use. At present these lands produce almost nothing because of two factors, one, these fields are not permitted to grow anything by the marauding herds because the moment a green leaf sprouts, it is plucked. Thus the fodder plants and the grasses are not permitted to store sufficient metabolic reserves to grow into vigorous producers of fodder. Secondly, genetically, these wild fodders are fit only to survive under these hard conditions. They are not genetically made to produce maximum organic material. Unless these survivors are replaced by high yielding varieties, fodder production would not improve. The replacement can be done slowly but naturally by closing the areas and letting site conditions improve so that ecological succession brings in more rigorous varieties and species. Alternately, fodder crops can be sown in these areas but if site quality is not improved simultaneously and effective closure is not done, the failure will be more likely and painful. Hence a more reasonable approach is to give the former treatment to Govt. lands, both forest and non-forest, while all private lands available for the purpose should be harnessed for fodder cultivation.

Thus, in a nut shell, the solution to our overgrazing problem lies in a judicious mix of short term and long term measures. As a short term measure, access to the forests for grazing must be curtailed, so that people have to work for maintaining their cattle and thus forcing them to reduce unproductive stocks in the long run. At the same time comprehensive steps must be taken to castrate scrub bulls, and popularise and make available artificial insemination and release of improved quality bulls and producing more fodder from areas especially earmarked for the purpose.

All this, obviously, can not be done by the forest departments alone. The Veterinary Departments, the Agriculture Departments and the Revenue Departments have a major role to play in implementing these steps. For all these major departments to work for a single



purpose is not possible unless co-ordination is not from the top. As the forest department will be the beneficiary of this concerted effort, they should lobby vigorously to create an authority which can bring in a bias in the thinking of these departments in favour of forests and their conservation. This bias if created, would result in reorienting their existing schemes of castration, cattle improvement and extension etc. to make the reduction of grazing pressure on our forests as one of the scheme objectives. Unless these departments lend a helping hand to the foresters, our cattle will remain our bare and no effort, however big, to recloth our denuded forests will be successful. Not even the biggest plantations targets, as our sacred cattle will eat it all,



# Population Dynamics of Elephants (*Elephas maximus maximus* Linn.) in Palamau Tiger Reserve, Betla, Bihar

By

D.S. Srivastava

*P.G. Deptt. of Zoology, G.L.A. College, Daltonganj-822101 (Bihar)*

## LOCATION:

The study area, Palamau Tiger Reserve, Betla spreads from latitude 23° 40'N to 23° 50'N and longitude 84°E to 84°E. It is the part of south Chhotanagpur of Bihar and covers the area of 929 sq. km which is divided in 202 sq. km of core and 729 sq. km of buffer zones. The terrain is undulating. The altitude varies from 200 metres to 1200 metres from north to south. The most striking topographical feature is the plateau of Neterhat with its outlying spurs. This plateau is the northern prolongation of the Pokharipat plateau of Ranchi and is separated in the west by isolated cup shaped valleys of Chhechharia from plateau of similar altitude in Surguja district of Madhya Pradesh. It is separated from the valley of river North Koel in the east. The northern part of the plateau having spurs and slopes on which major forests of study area are situated.

The forest is dry deciduous and rocks are laterite, quartzite, gneiss and amphibolite. The major river is North Koel which traverses the area. Burah and Auranga river are the main tributaries along with hill streams. The average rainfall is about 1572.50 mm. The temperature also varies greatly. The minimum temperature reaches to 50°C and maximum 52°C in different parts of the study area.

## POPULATION:

The elephants (*Elephas maximus maximus* Linn.) of Palamau constitute the second population of wild elephants in Bihar. A population of 200-300 elephants is found in Singhbhum district moving in the forests of Saranda, Kolhan, Porahat and Dalma. These elephants move upto Mayapurbhanj district of Orissa, Purulia district of West Bengal and Hazaribagh district of Bihar.

Elephant of Palamau forests have uncertain advent and thought to be the descendent of captive elephants released from time to time by Maharaja Surguja in early 1920. The survey and settlement record of Palamau Government estate Palamau district 1895-1897 by



D.H.I. Sunder listed every animal from tiger to mouse deer but without any mention of elephants. The Government of Bihar records fail to give any clue of the movement of elephants from Singhbhum via Gumla Forests.

The author met Sri Chand Sah and Sri Salamat Mian of village Betla who narrated that a herd of three elephants attacked their bullock cart and damaged pulses and rice bags which they were carrying for Khansanr workers in October, 1921 near present day Teno road in Baresand Forest. They used to supply food grains to Mayapur from Chhipadohar bazar and frequently came across this group. This is the first eye witness record of elephants in Palamau. The Mahauts of Ambikarpur also confirmed that the diseased elephants were regularly released from the 'Phil Khana' of Maharaja Surguja. Sri Kailash Ram a forest guard of forest department recalled that he saw an elephant with chain in Baresand Forests. The possibility of Surguja domestic elephants moving to Baresanr Forests and getting suitable habitat in Palamau forests and made their home in the study area but there is no scientific data or record available to prove this view.

#### POPULATION SEX RATIO:

The author conducted the census of the elephants with the active co-operation of Palamau Tiger Reserve authorities and by employing trackers in the month of December, when the elephants were dispersed in all the four ranges of the study area. The figures were verified again in the summer census when the movement of elephants are restricted to core area of Baresanr and Garu ranges. It is difficult to ascertain the exact figure, so the number may be counted to 5 (Table I).

TABLE 1

|                              | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 |
|------------------------------|------|------|------|------|------|------|------|------|------|
| Male (tuskers)               | 4    | 4    | 4    | 4    | 4    | 4    | 4    | 4    | 4    |
| Male (Makna)                 | 9    | 10   | 9    | 10   | 8    | 8    | 9    | 9    | 12   |
| Adult females                | 18   | 24   | 23   | 26   | 24   | 25   | 25   | 25   | 26   |
| Sub adult                    | 6    | 8    | 6    | 5    | 4    | 7    | 6    | 6    | 6    |
| Calves (3-6 years)           | 11   | 8    | 9    | 8    | 9    | 7    | 6    | 6    | 12   |
| Babies (2 months to 3 years) | 6    | 12   | 9    | 13   | 15   | 16   | 14   | 17   | 14   |
|                              | 54   | 62   | 60   | 66   | 62   | 67   | 65   | 68   | 74   |



**MORTALITY:**

The death occurrences record since 1978 are as follows:

| Year | No. of elephants                         | Place                                 | Cause                        |
|------|------------------------------------------|---------------------------------------|------------------------------|
| 1978 | 1 (male)                                 | Baresand comp. 16                     | Old age                      |
| 1979 | 1 (male)                                 | Ramandag comp. 2                      | Ruptured ligement            |
|      | 1 (male)                                 | Baresanr comp. 2                      | Unknown                      |
| 1980 | 1 (male)                                 | Ramandag comp. 5                      | Unknown                      |
| 1981 | 2 (babies)                               | Saidupe comp. 6                       | Unknown                      |
| 1982 | 1 (male)<br>2 (females)<br>1 (sub adult) | Saidupe comp. 1 & 2<br>(Railway line) | Accident with goods train    |
| 1983 | 2 (babies)                               | Ramandag comp. 1                      | Unknown                      |
| 1984 | 1 (male)                                 | Saidupe comp. 7                       | Unknown                      |
| 1986 | 1 (baby)<br>14                           | Betla comp. 1                         | Unknown (deserted by mother) |

**RECORDS OF NEW ARRIVALS:**

The numbers of new born babies were recorded at the time of census in December and May every year. The babies upto about 1 year old were taken under consideration.

| Years  | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | Total |
|--------|------|------|------|------|------|------|------|------|------|-------|
| Babies | 2    | 6    | 3    | 4    | 3    | 3    | 2    | 4    | 6    | 33    |

**NATALITY RATE:**

The ecological natality rate can be expressed as the average number of new individuals produced by that population in a unit of time. It can also be expressed by the formula

$$B = \frac{N}{T}$$

Where B — natality rate — N — Number of new individuals added to the population.  
% T — unit of time (Rastogi and Jayaraj 1979) N = 33 individuals born 1978 to 1986.

$$T = 9 \text{ years}$$

$$B = 33/9 = 3.666$$

Natality rate in the study area = 3.666 elephants/year.



**RATE OF MORTALITY:**

It can be defined as the number of individuals of a population dying unit of time.

So  $M = N/T$

$M$  — rate of mortality

$N$  — Number of deaths

$T$  — Unit of time

So, the death rate among elephants in study area

$$M = \frac{N = 14}{T = 9 \text{ years}} \\ = 1.555$$

**GROWTH IN POPULATION:**

The actual growth of the population can be expressed as following:—

$E$  = actual growth of population

$R_i$  = rate of natality

$R_e$  = rate of mortality

$T$  = time

$$\text{So } R = \frac{R_i - R_e}{T} = \frac{3.666 - 1.555}{1 \text{ year}} = 2.111$$

Growth rate of elephants = 2.111 elephant/year.

**POPULATION DENSITY:**

It can be defined as the number of individual of a population in per unit of area. This can be further delimited to crude density and ecological density. The crude density is the total number of individuals per unit of total area. Whereas ecological density is the number of individuals per unit of that area which is actually occupied (home range) by these individuals.

**HOME RANGE:**

Elephants in the study area has three district home ranges. Some area are occupied by the elephants throughout the year (home range-C), some areas utilised as the passage for home range shifting (migration) for about 15 days (home range-B) and some parts are occupied for about 6 months (home range-A).



## HOME RANGE-A

This home range comprises the forests of Betla range consisting of Betla compartment I, II and Durami covering about 3033.98 hectares. It is occupied by average 30 elephants for about 6 months (September to February).

## HOME RANGE-B

These forests are utilised by average 30 elephants while moving to Betla and back to Baresanr and Ramandag forests (home range-C) for about 15 days. It comprises the forests of Saidupe compartment 1 to 5 and Chungru protected forests. This home range has the spread of about 9201.63 hectares.

## HOME RANGE-C

This is the biggest home range covering an area of 27082.77 hectares of forests of Ramandag, Baresanr, Labhar, Mundu, Ladim, Mangra, Paharkocha, Ram selli, Bhawar-bandha, Garu, Maromar, Amwatikar, Haratu and Kumandi. This home range is occupied by an average of 30 elephants for 6 months and about 60 elephants for about 6 months.

## POPULATION DENSITY:

The population density can be expressed by the formula

$$D = \frac{n/a}{t}$$

Where D — population density

n — number of individuals

a — area (home range)

t — unit of time

*Population density in home range 'A'*

$$= \frac{30/3033.98}{5 \text{ year}} = 34$$

$$= \frac{30/3034}{.5} = \frac{.009}{.5} = .018$$

$$= .018$$

*Population density in home range 'B'*

$$= \frac{30/9202}{.166 \text{ year}} = \frac{.003}{.166} = .018$$

$$= .018$$

*Population density in home range 'C'*

$$= \frac{60/27083}{.05 \text{ year}} = .004 \text{ (from March to August)}$$



$$= \frac{30/27083}{.5} = .002 \text{ (from September to Feb.)}$$

So the population density in

$$\text{Home Range 'A'} = .018$$

$$\text{Home Range 'B'} = .018$$

$$\text{Home Range 'C'} = .004 \text{ (from March to Aug.)}$$

$$\text{and } .002 \text{ (from Sept. to Feb.)}$$

*Population density in entire elephant zone*

$$\text{Area} = 39318.38 \text{ Hect.}$$

$$\text{Average number} = \frac{538}{9} = 59.77 = 60 \text{ elephants}$$

$$\text{time} = 1 \text{ year}$$

$$= \frac{60/39318.38}{1}$$

$$= .0001$$

## DISCUSSION:

The exact advent of elephants in the study area is still controversial. There were no elephants in the area till 1897 as per the list of fauna of Palamau district prepared by D.H.I. Sunder for his survey and settlement report of Palamau district 1895-1897. The author's interview with local villagers and mahawats of Surguja led to the conclusion that elephants of Surguja might have crossed to Baresanr block of forests of Palamau in search of suitable habitat and stayed in this part leaving the Surguja forests entirely. The history of elephants in the study area is rather young and the reports on number of elephants in Palamau are varied. The records of Daltonganj South Forest Division and Mishra (1971) report the number to be about 60 in 1970. Shahi (1973) reported the presence of 45 elephants and Sahay (1979) put the number between 35-40. Shahi (1980) in his report to elephant specialist group put the number as 40. These fluctuations might have arisen due to absence of any specialised work particularly on elephants. Dobzhansky (1950) suggested that natural selection in tropics favoured low fecundity and slow development, while in temperate zone competitive advantage was bestowed on these species with higher fecundity and more development, Pianka (1970) however, did not agree with this. Pianka (1970) holds that R and K selections are not restricted to tropical and temperate climate. Only according to the matter and is R-K continuum with the R and representing a situation in which the optimum strategy is to place 100% of the matter and energy of an organism into reproduction with minimum of each individual off-spring



so as to produce the maximum number of progeny. This means that R-selection would give the change of light productivity.

The slow rate of off-springs to be born in elephants is an inherent property. Pianka (1970) indicated that at other end of continuum R and K selection would lead to highly efficient utilisation of environmental resource because of the recent legislation of stoppage of felling of trees, creation of core area, protection from poaching and fire etc. This has provided the elephants an opportunity to utilise the best environmental resources, hence the trend for increase.

The 33 babies born from 1978 are indicative of the utilisation of optimal adaptive strategy and all possible resources into survival and production of few off-springs with highly competitive ability confirmed by 5 deaths in 9 years.

Regarding home ranges, author feels that elephants have family groups and home range 'C' (Baresanr, Ramandag blocks) is the most suitable place forming a natural habitat of elephants. Nevertheless, occasional shifting is subject to the vegetation, temperature, water resources and other local factors. Author feels that elephants first came to home range 'C' and some of them started exploring the other areas also. This search led them to home range 'B' but they returned to old home range 'C' in summer. Thus only a family group which is expanding gradually visits home range 'B' and 'B' and rest in habit the home range 'C' only. This may be called coping strategy too.

#### ACKNOWLEDGEMENT:

Author offers sincere thanks to Forest Deptt. Bihar, Palamau Tiger Reserve authorities and Dr. P.N. Mehrotra, Head, Deptt. of Zoology, Ranchi University for valuable suggestions, guidance and help.

#### REFERENCES:

- Ait shuuler 1960. In Grzimek's Encyclopedia of Ethology, Von Nostrand Reinhold Co., New York.
- Ali, S.M. 1978. Facts and fancy of elephant life. *Zoologica* 1: 1: 6.
- Ali, S.M. 1980. Some aspects of behaviour and breeding biology of Indian wild elephants. *Tiger paper* 7 (4): 9.
- Anonymous 1978. Asian elephant specialist group new 14 CN/SSC Tiger paper 5 (4): 31-35.
- Damied, J.C. (Ed) 1980. The status of Asian elephant in India IUCN/SSC, Asian elephant specialist group publication, Bombay.



- Dobzansy, T. 1950. Evolution in tropics. *American Science* 28-221.
- Dodsworth R.I. 1914. Distribution of mammals in India, Govt. Press, Calcutta.
- Douglas-Hamilton Iran. 1980. African elephant population table. *African* 7 (2): 36.
- Gee, E.P. 1964. Wildlife of India. Collins, London.
- Guy, P.R. 1981. Changes in the biomass and productivity of wood land in Sangwa wildlife research area, Zimbabwe. *J. App. ECO*, 18 (2) 507-520.
- Iswaran, N. 1981. Comparative study of Asiatic elephant, *Elephas maximus*, population in Golayan, Srilanka. *Biol. Conservation* 24 (4): 303-313.
- Jachmann, H. 1980. Population dynamics of elephants in the Kasungu National Park, Malawi, *Neth J. Ecol.* 30 (4) 623-634.
- Mishra, J. 1971. An assessment of annual damage to crops by elephants in Palamau district, Bihar. *J. Bom. Nat. Hist. Soc.*, 28 (2) : 387-310.
- Pianka, R. 1970. Species diversity in organic evolution, Rastogi, 140-146 Kedar Nath, Ram Nath, Meerut.
- Sahay, R.C. 1979. Tourism in Palamau Tiger Reserve. International Symposium on Tiger New Delhi.
- Shahi, S.P. 1977. Backs to the wall. Saga of wildlife in Bihar-East-West Press, Bombay.
- Shahi, S.P. 1980. A report on status of elephants in central India. IUCN/SSC Elephant specialist group, Bombay.
- Sunder, D.H.I. 1897. Survey and settlement record of Palamau Government Press, Calcutta.

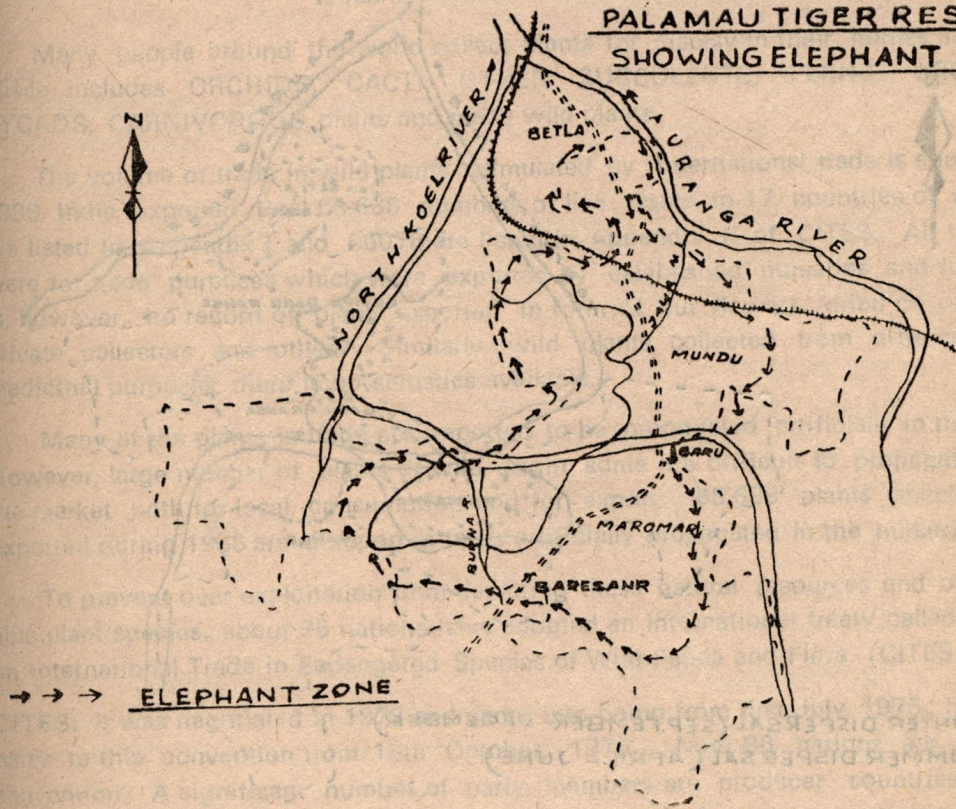


# International Trade On Wild Indian Plants

MAP SHOWING DISPERSAL OF ELEPHANTS IN

PALAMAU TIGER RESERVE

## PALAMAU TIGER RESERVE SHOWING ELEPHANT ZONE



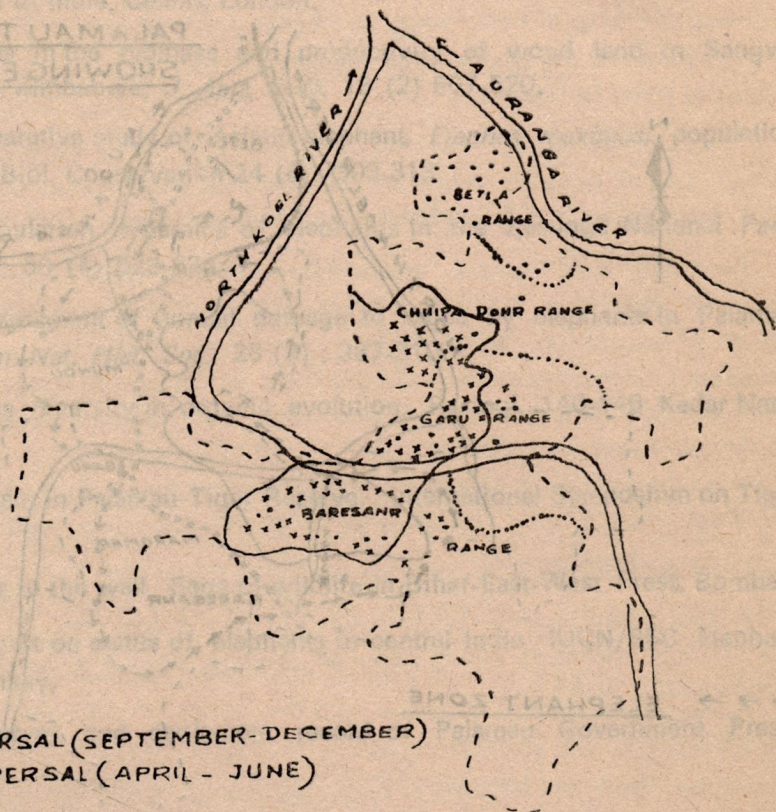
CITES regulate international trade in wild species but the nations have not yet possibly the most likely to become a member of this convention.

Source: CITES Annual Report published by Management Authority CITES Secretariat, Geneva and Wildlife, Govt of India, 1988.



MAP SHOWING DISPERSAL OF ELEPHANTS IN  
PALAMAU TIGER RESERVE

PALAMAU TIGER RESERVE  
SHOWING ELEPHANT ZONE





# International Trade On Wild Indian Plants

By

S.K. Mukherjee, IFS

*Wildlife Institute of India, Dehra Dun*

Many people around the world collect plants for display in their homes and gardens. These includes ORCHIDS, CACTI, OTHER SUCCULENTS, FERNS, BROMILIADS, CYCADS, CARNIVOROUS plants and many wild plants.

The volume of trade in wild plants stimulated by international trade is enormous. \*In 1986, India exported total 68,688 numbers of live plants to 17 countries of which 2610 are listed in Appendix I and 66078 are listed in Appendix II of CITES. All those plants were for trade purposes which were exported by established nurseries and firms. There is, however, no record of plants exported in form of cut flowers, dried or otherwise by private collectors and others. Similarly, wild plants collected from different areas for medicinal purposes, there is no statistics available.

Many of the plants in trade are reported to be propagated artificially in the nurseries. However, large number of plants of wild origin some are difficult to propagate also enter the market both for local consumption and for export. 68,688 plants specimen legally exported during 1986 are all reported to be artificially propagated in the nurseries..

To prevent over exploitation from depleting these natural resources and other vulnerable plant species, about 96 nations have adopted an international treaty called Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

**CITES:** It was negotiated in 1973 and came into being from first July, 1975. India became party to this convention from 18th October, 1976. Now 96 nations are party to this convention. A significant number of party members are producer countries and export wild plants and its parts for trade purposes to number of consumer countries. However, many exporting countries like Mexico, Turkey, etc. are not party to this convention and similarly many importing countries are not member to this convention.

CITES regulate international trade in wild species that the nations have agreed are possibly threatened by over exploitation or likely to become if immediate steps are not taken.

---

\*Source— CITES Annual Report published by Management Authority CITES, Deptt. of Environment, Forests and Wildlife, Govt. of India, 1986.



The species are listed in three appendices. Appendix I of CITES contains those species believe to be now threatened with extinction. Party countries generally allow export of such species for scientific purposes that will benefit the species survival in the wild. To ensure strict control, both the importing and exporting countries must issue a permit before the shipment may occur.

Appendix II includes species that are not necessarily threatened at present, but may become so if trade is not regulated. Exporting countries generally allow commercial trade but only after determining that it will not harm wild population.

In Appendix III any party may propose inclusion of those species which may not be threatened species but the proponent country wishes to seek international co-operation in regulating trade on those species.

The CITES system also promotes propagation of plants in the appendices. Therefore, conditions for trade in propagated species are more lenient than those for plants taken from wild populations whether as plants, or as seeds, cuttings, rhizomes, or other plant parts :

**Appendix I :** As of today about 100 plant species are listed in Appendix I including following Indian species\*\* :

| Family       | Species                                   |
|--------------|-------------------------------------------|
| COMPOSITAE   | <i>Saussurea lappa</i> (Kuth)             |
| NEPENTHACEAE | <i>Nepenthes khasiana</i> (Pitcher plant) |
| ORCHIDACEAE  | <i>Vanda coerulea</i> (Blue Vanda)        |
| CYCADACEAE   | <i>Cycas beddomes</i>                     |

**Appendix II :** This Appendix contains all species in the following groups which are not listed in the more protective Appendix I : *ORCHID*, *CACTI*, *CYCADS*, *ALOES* and *PACHYPODIUM*. In addition it includes succulent *Euphorbia*, several species of other plants.

**Appendix III :** Only Nepal has listed following species in Appendix III of CITES :

|                 |                               |
|-----------------|-------------------------------|
| GNETACEAE       | <i>Gnetum moutanum</i>        |
| MAGNOLIACEAE    | <i>Taluama hodgsonii</i>      |
| PAPAVERACEAE    | <i>Podocarpus neriifolius</i> |
| TETRACENTRACEAL | <i>Tetracentron sinense</i>   |

---

\*\*Many species of CACTACEAE listed in Appendix I of CITES are cultivated and found in India but they are not native to India.



International trade in wild plants are allowed for commercial purposes excepting those listed in Appendix I as long as it is at levels which the species can support. In some cases the trade is so large as to raise concern about the species long-term survival.

### STRICTER DOMESTIC MEASURES

CITES allows party countries to enact more stringent trade controls to supplement the treaty. India has adopted such measures and allows commercial export of plants only if the Chief Wildlife Warden of State or his authorised officer certifies that specimen were propagated artificially in nurseries and have not been collected from wild. India has also listed about fourteen plant species export of which including parts and products are normally not allowed for trade purposes.

### PROBLEMS

High volume of trade, low level of enforcement and poor input from Scientific Authority (Flora) are some of the problems towards effective control of international plants trade. The volume of trade is quite high.

Out of the total plants exported during 1986, 11,300 specimen of *Pleione maculata* a species of ORCHID listed in Appendix II was exported to Japan. The leading importing countries during 1986 were as follows :

|                             |        |                                    |
|-----------------------------|--------|------------------------------------|
| Japan                       | 19,215 | Nos. of plants imported from India |
| United States of America    | 13,406 | —do—                               |
| Great Britain               | 8,317  | —do—                               |
| Netherland                  | 7,768  | —do—                               |
| Federal Republic of Germany | 6,356  | —do—                               |

The international and domestic trade in wild plants flourishes because of the large market for such plants and public's lack of knowledge about the trade's effects and legal measures adopted to control them. Greater awareness drive and better legal protection to commercially important wild plants is essential.

---



## On *Vanessa cashmirensis* Kollar (Lepidoptera : Nymphalidae) : Wings collected from under a stone in Almora District (U.P.)

By

G.S. Arora

Northern Regional Station, Zoological Survey of India, Dehra Dun

During a recent Survey-tour to the Western Himalayas (U.P.), wings of a species of butterfly, viz., *Vanessa cashmirensis* Kollar (Lepidoptera: Nymphalidae) was collected from understone. The locality details are as follows:

U.P. : Western Himalayas

District ALMORA

Kameridevi, ca 4 kms on Kameridevi-Kanda Road (on way to Bageshwar)

Altitude: 1750 m

Date: 13.1.1989

Temperature (around camp at Berinag) : Min. 1°C; Max. 8°C

Collector: G.S. Arora

It may be mentioned here that the Kumaon hills received heavy snowfall in this area around first week of January, '89, and the cold-wave conditions continued till about the end of January, '89. As a result, this sector between Berinag and Chakori (Distt. Pithoragarh), and between Chakori and Kanda (Distt. Almora) was covered with snow patches all around. At some places the snow level stood upto 10"-12" from ground during our visit. Accordingly, the ground from where these wings were collected understone, was covered with patches of snow about 4"-5" thick all around. Even a small pool of water was covered by a thick frozen sheet, which could be lifted out of water body. However, no aquatic fauna was available from this pool.

The material contained the following:

*Fore wings*: Three pairs (6 pieces)

*Hind wings*: Two pairs (4 pieces)

None of the wings was complete when collected but could be easily identified on the basis of colour pattern. The measurements of the wings, of those which were nearly complete, were as follows:



F.W. length (costa to apical margin) : 27 mm  
F.W. width (at other margin) : 19 mm  
H.W. length (base to apical margin) : 20 mm  
H.W. width : 20 mm

The recorded expanse of the forewings (*Vide* Wynter-Blyth, 1957) is between 55-65 mm, which shows that the above-mentioned measurements fall within this range.

Further, it may be mentioned that the same species was also observed flying in this area, although the number was very small and of rare occurrence at the site. These specimens were collected only at Jhulaghat, 500 m (Distt. Pithoragarh) flying actively over wheat and sarson fields, on 17th and 19th January, '89. Later, these were found to be breeding on 'Nettles' bushes, close to the fields, but nowhere their wings were found under any of the stones turned for the collection of 'under-stone' fauna at Jhulaghat, or any other place.

The collection of wings from understone can not be explained easily, particularly in view of the fact that neither this species hibernates at any stage, nor the larvae pupate under ground or under the stone. The only possible explanation of their presence understone can be understood by another observation in the field itself that there existed, under the same stone, a nest of hymenopteran ants, and as many as 200 specimens were collected from the same area along with these wings. It may also be mentioned that other body parts of these specimens were not traceable. It is quite possible that these were found dead or immobilised over ground due to the extreme cold condition, by ants. As is often observed, the ants have the habit of dragging dead or immobilised material to their nests for consumption. Had it been lizard or any other predator, it would have been devoured, nearly, completely, without leaving any trace of wings. Moreover this is not the case of predation but of scavenging.

Nevertheless, it is most noteworthy that the ten pieces of wings belonged to three specimens of *one* species and was collected under a *single* stone. Were the adults congregating at the time of weather calamity? It will remain a mystery, since their adults hitherto have not been reported to congregate unlike their caterpillars which were observed to do so, at Jhulaghat.

The recorded distribution (*Vide* Wynter-Blyth, 1957 and Piele, 1937) of the species includes Western Himalayas, describing this as very common between May-September, at Mussoorie and Doon Valley and very common between March-October, in Kumaon Hills. The present specimens have been collected in the month of January, 1989, which by itself is an interesting record.



The author gratefully acknowledges thanks to the Director, Zoological Survey of India, for all the facilities provided to him.

### LITERATURE CITED

- PIELE, Lt. Col. H.D. 1937. *A Guide to Collecting Butterflies of India*, xii + 312 pp., Plates I-XXV (Jhon Bale Sons & Danielsson Ltd., London).
- WYNTER-BLYTH, M.A. 1957. *Butterflies of Indian Region*, xx + 523 pp., Plates 1-72 (The Bombay Natural History Society, Bombay).



# Threatened Wildlife Of Orissa

BY

S.C. Nahar and A. Mohapatra

*Estuarine Biological Station, Zoological Survey of India, Berhampur (Gm) 760005, Orissa*

## INTRODUCTION :

Since the early inception of human civilisation man knew about the utility of nature and natural resources around him. Dominating other creatures on the earth he started interfering with the environment. Protection of our own environment where we thrive is a challenging task before us upon which the future of our civilisation depends. In broad sense wildlife includes the entire fauna and flora found in the wild habitats. Due to lack of man's farsightedness, urge for rapid development and due to population growth the magnificent wildlife is threatened with great extinction. Utilisation of any kind of natural resources needs thorough planning before its use so that the natural balance is not hampered. Ecology plays an important role in economic development of the Nation. The living resources which are renewable should not be over-exploited as the genetic pool is disturbed. It is easy to destroy any species but rather impossible to create the same. Hence it is our prime duty to protect and preserve any species before its extinction.

Orissa with an area of 1,55,842 sq. km is a small state but is rich in its fauna and flora. Here, the forest area occupies 67,673 sq. km including 18 sanctuaries/national parks notified so far covering an area of 5,671 sq. km. During the British regime 41% of land was under forest covering particularly the Eastern Ghats region. After independence there was a drastic change in the state due to overpopulation, more pressure on land, rapid urbanisation and industrial development. Vast stretch of coastal areas, estuaries, brackishwater spread of Chilka, fertile coastal plains together with laterite patches, hilly areas of Eastern Ghats and dense forest of Similipal with varied vegetation are the remarkable habitats favourable for wildlife.

Similipal is well known for the tiger reserves in the country and is the largest forest area in the state having high hill ranges ranging from 100 to 1000 metres. Sal, piasal, gambhar, champa and other varieties of flora are growing abundantly here providing good habitats for wild animals. Orchids and ferns further add in glorifying the natural beauty of the forest. Bhitarkanika sanctuary, a mangrove ecosystem is famous for inhabitation of salt water crocodile and water monitor lizards in its tidal rivers. Many local and migratory birds also visit during the season. Python and king cobras also found in the deltaic region, Satkoski gorge, has got worldwide importance for the rehabilitation of



crocodiles (Mugger, Gharial and Estuarine Crocodile) initiated by the state under a centrally sponsored scheme on the consultancy visit report by Dr. H.R. Bustard, FAO expert on crocodile breeding and management. Gharial has been saved from mere extinction. Black bucks and the endangered antelopes are being protected by the local people in the private farm land near Aska, Ganjam district. Nearly about 600 black bucks have been observed there. Wild buffaloes have been reported from Kondakamberu area of Koraput district adjacent to Madhya Pradesh the population of which is declining to an alarming stage. Joint efforts by Orissa and M.P. is needed to protect them from more extinction. Swamp deer, an endangered mammal, has been reported from the Sunnebada plateau in the Kalahandi district. The area has already been declared a sanctuary. Coastal sand particularly Gahirmatha area of Bhitarkanika sanctuary is a suitable nesting ground for olive ridle turtles. A marine tortoise research centre is also established there since 1976. Olive ridle turtles have also been reported from Hukitola near Paradweep and Penthakata, Astaranga of Puri District. Chilka, the beauty queen of Orissa, is the largest brackishwater lagoon in the country specially important for its fishery resources as well as its other fauna and flora. Variety of migratory and local birds visit the lagoon from distant places like Siberia, Mansarovar and Central Asia. They visit for laying eggs and rearing their offsprings during winter and return back on the onset of summer. The authors have also observed marine dolphins near mouth area of the lagoon (Arakhakuda). The Nandan Kanan Biological park, situated in a natural forest is famous for breeding indigenous wild animals like white tiger, black panthers in captivity. The gharials were also bred here for the first time in the world. In addition other rare wild animals such as Indian Pangolin, lion tailed macaque and mouse deer have also been bred here successfully.

In this paper a brief account of the threatened wild animals of Orissa is given which comprises of their scientific as well as common names, their categories in brackets like E, V, R, T and I, distribution and present status. 'E' stands for Endangered, 'V' for Vulnerable, 'R' for Rare, 'T' for Threatened and I for Indeterminate species.

### Systematic List

#### MAMMALS

##### Order—Carnivora

#### 1. *Canis aureus* (Linnaeus)

(V)

The Jackal

Distribution : Throughout India.

Status : Population declined due to its persecution for pelt, death due to pesticides and also being severely killed as destroyer of sugar cane and water melon fields.



2. *Vulpes bengalensis* (Show)

(V)

## The Indian Fox

Distribution : Throughout Indian regions except the extreme northwestern borders.

Status : Beneficial to man as it checks agricultural pests like field rats, extensively hunted for its pelt, flesh and bones out of superstitious belief, pesticides and harmful insecticides also responsible for its premature death.

3. *Cuon alpinus* (Pallas)

(V)

## The Indian Wild Dog

Distribution : Throughout India.

Status : Extensive persecution and habitat shrinkage resulting in its population decline.

4. *Melursus ursinus* (Show)

(V)

## Sloth Bear

Distribution : Throughout India extending from the foothills of the Himalayas to the extreme southern most parts.

Status : Population depleted due to habitat destruction, killing for its medicinal value of its bile, trapping for Zoo or entertainment.

5. *Mellivora capensis* (Schreber)

(V)

## Ratel or Honey Badger

Distribution : Occurs from the base of the Himalayas to Cape Comorin, also reported from Similipal (Orissa).

Status : Population depleted as it is severely being killed for its destructive nature to man's livestock.

6. *Felis viverrina* (Bennett)

(V)

## Fishing cat

Distribution : Throughout India in certain pockets; reported from Assam, Sunderbans (West Bengal), Chilka lake (Orissa) and the back waters of Kerala.

Status : Population declined due to loss of habitat for various reasons.

7. *Panthera pardus* (Linnaeus)

(V)

## Leopard or Panther

Distribution : Throughout India.

Status : Run down of its population due to excessive hunting for pelt, reduction of prey species and habitat shrinkage.



8. *Panthera tigris* (Linnaeus)

(V)

## The Tiger

Distribution : Throughout India extending from the Himalayas to Cape Comorin except the northwestern region.

Status : Population declined much due to deforestation, shrinkage or habitat, decrease of prey species and its extensive killing for its magnificent skin; presently preserved and maintained in Sanctuaries/national parks/reserve forests under project tiger.

## Order—Artiodactyla

9. *Tragulus meminnis* (Erxleben)

(V)

## Mouse Deer

Distribution : Southern India and through eastern part of Madhya Pradesh and Orissa to Chotanagapur in Bihar.

Status : Presently seldom seen in its areas of occurrence, vulnerable due to its extensive hunting by human beings for flesh; death also due to predation by carnivores.

10. *Cervus duvauceli* (G. Cuvier)

(E)

## Swamp Deer

Distribution : The swamp deer is found in the Terai and Duars of the northern and eastern India.

Status : In Orissa the Sunebada plateau in the Kalahandi district which has already been declared as sanctuary has also been reported for occurrence of swamp deer.

11. *Tetracerus quadricornis* (Blainville)

(V)

## Four horned Antelope

Distribution : Peninsular India extending north to Rajasthan and northeast to Bihar and Orissa.

Status : Population depleted due to shrinkage of habitats and poaching for its flesh.

12. *Bos gaurus* (H. Smith)

(V)

## Gaur

Distribution : Nepal to Arunachal Pradesh, South to Nagaland, Assam, Mizoram, Duars to West Bengal, Bihar, Orissa and in Peninsular India.

Status : Run down of its population due to shrinkage of habitat persecution; presently existing in the forests of Tamil Nadu, Kerala, Karnataka, Madhya Pradesh, Bihar, West Bengal, Assam and Nepal. In Orissa reported from Baisipalli and Badrama.



13. *Bubalus bubalis* (Linnaeus) (E)  
Wild Buffalo

Distribution : Occurs in the grass jungles of Nepal Terai extending eastwards to the plains of Brahmaputra in Assam and Arunachal Pradesh. Also found in Raipur and Bastar districts (M.P.) and Western part of Orissa.

Status : The Kondakamberu area of Koraput district (Orissa) needs a special attention for their protection as the population has declined to an endangered level.

14. *Antelope cervicapra* (Linnaeus) (E)  
Black Buck

Distribution : Throughout Indian plains, the eastern limit being Chilka lake in Orissa.

Status : In the private farm land in Ganjam District near Aska (Orissa) there are near about 600 black bucks being protected by the people of nearby areas. Population declined due to excessive killing, shrinkage of its habitat and rapid agro industrial developments.

#### Order—Cetacea

15. *Balaenoptera musculus* (Linnaeus) (E)  
Blue Whale

Distribution : Known from Bay of Bengal and Arabian Sea.

Status : Endangered due to its extensive hunting for Commercial purposes, presently protected by delimiting its capture.

16. *Physeter catodon* (Linnaeus) (E)  
Sperm Whale

Distribution : In the Bay of Bengal; in all the tropical and subtropical seas; visits of and on Arctic waters.

Status : Indiscriminately being killed by man for sperm oil and ambergris, blubber and intestine.

#### BIRDS

##### Order—Anseriformes

1. *Rhodonessa caryophyllaca* (Latham) (Extinct)  
Pink Headed Duck

Distribution : Northern and northeastern India (Orissa, Bihar, Bengal, Assam and Manipur).

Status : Last record from Dharbhanga, Bihar in 1935; Extinct now due to shrinkage of habitat and excessive hunting.



## Order—Galliformes

2. *Pavo cristatus* (Linnaeus)  
Indian Peafowl

Distribution : Cosmopolitan.

Status : National bird; fully protected under the Wildlife (Protection) Act of India, no persecution of this bird in Rajasthan and Gujarat on religious grounds.

## Order—Gruiformes

3. *Sypheotides indica* (J.F. Miller) (R)  
Lesser Florican

Distribution : Throughout India except the humid areas.

Status : Rare due to destruction of its habitat and extensive hunting for its flesh.

## Order—Strigiformes

4. *Bubo bubo* (Linnaeus) (E)  
Great horned owl

Distribution : Throughout India.

Status : Endangered due to gradual destruction of its habitat and consequent shortage in its food availability.

5. *Athene blewitti* (Hume) (R)  
Forest spotted owl

Distribution : Peninsular India, ranging from Dangs district Gujarat south to erstwhile West Khandesh of Maharashtra, East to eastern Madhya Pradesh and Sambalpur area of Orissa.

Status : Rare, no any recent report from Orissa.

## Order—Coracii formes

6. *Anthracoceros malabaricus malabaricus* (Gmelin) (R)  
Indian pied Hornbill

Distribution : Himalayan foothills from Punjab east to Bhutan northeastern states of India, West Bengal, Bihar, Orissa, eastern parts of Madhya Pradesh and Andhra Pradesh.

Status : Rare due to deforestation, non-availability of suitable nesting trees, hunting for the medicinal values of its flesh, fat, bones and casque.

7. *Anthracoceros coronatus coronatus* (Boddaert) (R)  
Malabar pied Hornbill



Distribution : Chhotanagpur plateau in Bihar and adjacent areas of west Bengal and Orissa, Andhra Pradesh, Madhya Pradesh, Western Ghats from Ratnagiri to Kerala.

Status : Rare due to extensive killing for medicinal uses and charm of the tribal people.

## REPTILES

### Order—Testudines

1. *Lepidochelys olivacea* (Eschscholtz) (R)

Olive Ridley Turtle

Distribution : Occurs on the east coast (Digha in West Bengal and Orissa) and Andaman Islands.

Status : Rare due to extreme predation of its eggs and slaughter of nesting adults for flesh by human beings. Reported from Gahirmatha near Bhitarkanika mangrove (Orissa).

### Order—Crocodylia

2. *Gavialis gangeticus* (Gmelin) (E)

Gharial

Distribution : Mainly restricted to the Indus, the Ganges, Mahanadi and Brahmaputra rivers and their tributaries.

Status : Reported from Satkosia gorge, Tikarpara (Mahanadi, Orissa). Endangered due to disturbance in its habitat, killing for skin predation of its eggs and hatchlings by fishes, monitor lizards, birds of prey and other carnivores; its eggs also taken by tribals.

3. *Crocodylus porosus* (Schneider) (E)

Estuarine Crocodile

Distribution : Widely distributed in east coast of India and the Andaman & Nicobar Islands.

Status : Threatened throughout the world on account of its excessive hunting for hide and for its habitat destruction, over-exploitation for its commercial value of skin; presently confined to the estuaries of the Ganges and Mahanadi (Orissa).

4. *Crocodylus palustris* (Lesson) (E)

Mugger or the Marsh Crocodile

Distribution : Found in scattered populations all over India, except Jammu and Kashmir, Himachal Pradesh, Punjab and the north western desert region.



Status : Reported from tidal rivers near Bhitarkanika mangrove (Orissa), threats to its survival mainly due to hunting for hide and medicinal value, predation of eggs and hatchlings by birds like herons and storks and other carnivores.

#### Order—Squamata

5. *Varanus salvator* (Laurenti) (E)  
Water Monitor

Distribution : Throughout India including Andaman & Nicobar islands.

Status : Endangered, extensively killed for its excellent leather having very high demand in World market, protected now under Schedule-I of the Indian Wild Life (Protection) Act, 1972. Recent report from tidal rivers of Orissa near Bhitarkanika sanctuary.

6. *Varanus bengalensis* (Daudin) (E)  
Common Indian Monitor

Distribution : Throughout India.

Status : Population alarmingly dwindled due to excessive exploitation of the adults for their commercially valuable skins.

7. *Python molurus* (Linnaeus) (R)  
Indian Rock Python

Distribution : India, Bangladesh, Pakistan and Sri Lanka.

Status : Rare due to international trade in its skin having very high demand in the World market. Recent record from Tulu village, Ganjam district (Orissa), 1985. and also from Bhitarkanika mangrove (Orissa) and other areas.

Concluding Remarks:— The Wildlife (Protection) Act, 1972 has been enforced in the state since 1974 and Wildlife rule since 1975. A separate Wildlife wing has been established and is maintained under the charge of a Chief Wildlife Warden in the rank of Conservator of Forests. Recently four new wildlife divisions were added to the existing two. Creating and awareness among the public about the wildlife and its utility is an important factor in the protection of wildlife. The Government's efforts alone can do nothing in protection of the wildlife unless and until there is moral support, mutual co-operation and self realisation of the general public.

#### ACKNOWLEDGEMENT

The authors are thankful to Dr. B.S. Lamba, Joint Director-in-Charge, Dr. A.K. Ghosh, Deputy Director, Zoological Survey of India and Dr. Kaza V. Rama Rao, Officer-in-Charge, Estuarine Biological Station Berhampur (Gm) for constant encouragement and facilities.



## Africa is Becoming an Elephant Graveyard

*Africa has lost half its elephants; well-armed poachers and a ready market for ivory are responsible; a new law might help*

IN THE LAST CENTURY, ivory traders almost wiped out the elephants of East Africa. Now conservation biologists are warning that unless dramatic action is taken, modern-day poachers armed with AK-47 assault rifles and chain saws may succeed where their predecessors failed.

Researchers believe that Africa lost half of its elephants in the last decade. Though the rigor of the census varies, conservation organizations estimate that 700,000 animals are left. Even this number is far from certain. Surveys from West and Central Africa, where elephants live in the forests, are too unreliable to make confident statements. The jungles of Zaire alone may support between 100,000 and 500,000 individuals. No one knows. But the trend is clear. Says Jorgen Thomsen of the World Wildlife Fund in Washington: "The decline has been both spectacular and indisputable."

The dwindling supply of elephants is matched by an enormous demand for ivory, especially in Japan, which carves ivory into *hanko*, the personal seals used in transactions instead of a signature. Thomsen also suspects that traders may be stockpiling ivory, as one might hoard gold or silver, speculating on the market. Ivory now fetches as much as \$ 200 a kilogram. Says Mark Willis of the State Department: "It's a bit like the drug trade. The more you try to control it, the more expensive it becomes."

The reason for the dramatic decline of the African elephant is not habitat destruction, but indiscriminate poaching. As much as 80% of the ivory on the world market in any given year is believed to be illegally acquired. Even elephants in Africa's famous wildlife preserves are not safe. For example, in recent years Kenya has lost some 70% of the elephants living within park boundaries.

Several African countries, including Kenya, have responded to the runaway slaughter of elephants by initiating shoot-on-sight policies aimed at poachers. Heavily armed themselves, the poachers are shooting back.

The grim situation has led some conservationists to call for a complete ban on all ivory imports to the United States and Europe. However, there is considerable debate over the wisdom of a total ban, since it would only drive the trade completely underground. Congress recently rejected the all-or-nothing approach when it passed the African Elephant Conservation Act of 1988. The law allows African nations to continue to trade



in ivory, an important source of hard currency, but it also aims to clamp down on the poaching by placing moratoria on countries that do not play by the rules. Marshall Jones of the U.S. Fish and Wildlife Service, the agency responsible for implementing the law, says: "The idea is to make the bad guys orphans in commerce."

The wildlife service took the first step last month when it banned the importation of all ivory from 77 countries that are not parties to the Convention on International Trade in Endangered Species (CITES). The law has teeth, say its proponents, for it not only isolates the rogue producers, it punishes the intermediary countries that trade in tainted ivory. For example, because Gabon is not a party to CITES, all ivory from Gabon is now banned. Furthermore, any country that deals in ivory from Gabon is barred from selling any of its ivory to the United States. It is hoped that a major ivory-carving center such as Hong Kong, which exports about one third of its product to the United States, will exert pressure on countries like Gabon to join the CITES brotherhood.

It is too soon to tell if the new law will have much impact. The ivory trade is notoriously resilient. Traders and poachers have been quite adept at circumventing the law.

Until recently, much of the tainted ivory moved through the small and impoverished nation of Burundi. The new government of Burundi has vowed to stop the illegal trade. It confiscated a large stockpile of ivory, and now it is seeking international assistance in getting rid of it, since such a valuable cache is politically destabilizing. "It's like sitting on a powder keg," says Jones. "Selling that ivory would fund the next revolution."

In the past, illegal ivory from Burundi would travel through intermediary countries to be "laundered." Traders in Hong Kong, for example, imported ivory from Dubai, a free-trade zone in the United Arab Emirates, where the tusks were superficially carved. This allowed Hong Kong traders to import "ivory artwork" from Dubai without bringing into play the CITES restrictions that apply to raw ivory. Thomsen has an example of such handiwork in his Washington office. It is a 3-foot tusk with a few inches of shallow doodling at one end. After considerable pressure, Hong Kong tightened the loophole in August and will now require all carved ivory to be accompanied by permits confirming its legal origin.

As mandated by the African elephant act, the wildlife service is now charged with reviewing the conservation programs of all African countries with wild elephants. If the programs do not pass muster, ivory trade in that country will be banned in 1990. Many African states will have a hard time convincing the wildlife service that they have their poaching under control. Decades of civil unrest left a legacy of heavy weaponry in Africa. The poachers are sophisticated and well armed. The park rangers lack morale and support. For \$ 25 a month, who wants to confront a small army of determined men with automatic weapons?



(See Rule 8)

In a study done by the Zimbabweans, it was estimated that it would cost \$ 200 per square kilometer per year to adequately protect the elephants in the parks. Zimbabwe, with one of the finest conservation programs in Africa, spends about \$ 160 per square kilometer. Most of Africa spends about 50 cents. The new legislation authorizes the U.S. Fish and Wildlife Service to spend \$ 25 million over the next 5 years helping the Africans, but the funds have not yet been appropriated.

# ● WILLIAM BOOTH

1. Name and address of individuals who own the newspaper and publishers or shareholders holding more than one per cent of the total capital.
2. Name of the Printing Press and the true and precise description of the premises.
3. Name, Address, Nationality, Editor's Name, and Publisher's Name.
4. Name, Address, Nationality, Editor's Name, and Publisher's Name.
5. Name, Address, Nationality, Editor's Name, and Publisher's Name.
6. Name, Address, Nationality, Editor's Name, and Publisher's Name.
7. Name, Address, Nationality, Editor's Name, and Publisher's Name.
8. Name, Address, Nationality, Editor's Name, and Publisher's Name.
9. Name, Address, Nationality, Editor's Name, and Publisher's Name.
10. Name, Address, Nationality, Editor's Name, and Publisher's Name.
11. Name, Address, Nationality, Editor's Name, and Publisher's Name.
12. Name, Address, Nationality, Editor's Name, and Publisher's Name.
13. Name, Address, Nationality, Editor's Name, and Publisher's Name.
14. Name, Address, Nationality, Editor's Name, and Publisher's Name.
15. Name, Address, Nationality, Editor's Name, and Publisher's Name.
16. Name, Address, Nationality, Editor's Name, and Publisher's Name.
17. Name, Address, Nationality, Editor's Name, and Publisher's Name.
18. Name, Address, Nationality, Editor's Name, and Publisher's Name.
19. Name, Address, Nationality, Editor's Name, and Publisher's Name.
20. Name, Address, Nationality, Editor's Name, and Publisher's Name.
21. Name, Address, Nationality, Editor's Name, and Publisher's Name.
22. Name, Address, Nationality, Editor's Name, and Publisher's Name.
23. Name, Address, Nationality, Editor's Name, and Publisher's Name.
24. Name, Address, Nationality, Editor's Name, and Publisher's Name.
25. Name, Address, Nationality, Editor's Name, and Publisher's Name.
26. Name, Address, Nationality, Editor's Name, and Publisher's Name.
27. Name, Address, Nationality, Editor's Name, and Publisher's Name.
28. Name, Address, Nationality, Editor's Name, and Publisher's Name.
29. Name, Address, Nationality, Editor's Name, and Publisher's Name.
30. Name, Address, Nationality, Editor's Name, and Publisher's Name.
31. Name, Address, Nationality, Editor's Name, and Publisher's Name.
32. Name, Address, Nationality, Editor's Name, and Publisher's Name.
33. Name, Address, Nationality, Editor's Name, and Publisher's Name.
34. Name, Address, Nationality, Editor's Name, and Publisher's Name.
35. Name, Address, Nationality, Editor's Name, and Publisher's Name.
36. Name, Address, Nationality, Editor's Name, and Publisher's Name.
37. Name, Address, Nationality, Editor's Name, and Publisher's Name.
38. Name, Address, Nationality, Editor's Name, and Publisher's Name.
39. Name, Address, Nationality, Editor's Name, and Publisher's Name.
40. Name, Address, Nationality, Editor's Name, and Publisher's Name.
41. Name, Address, Nationality, Editor's Name, and Publisher's Name.
42. Name, Address, Nationality, Editor's Name, and Publisher's Name.
43. Name, Address, Nationality, Editor's Name, and Publisher's Name.
44. Name, Address, Nationality, Editor's Name, and Publisher's Name.
45. Name, Address, Nationality, Editor's Name, and Publisher's Name.
46. Name, Address, Nationality, Editor's Name, and Publisher's Name.
47. Name, Address, Nationality, Editor's Name, and Publisher's Name.
48. Name, Address, Nationality, Editor's Name, and Publisher's Name.
49. Name, Address, Nationality, Editor's Name, and Publisher's Name.
50. Name, Address, Nationality, Editor's Name, and Publisher's Name.
51. Name, Address, Nationality, Editor's Name, and Publisher's Name.
52. Name, Address, Nationality, Editor's Name, and Publisher's Name.
53. Name, Address, Nationality, Editor's Name, and Publisher's Name.
54. Name, Address, Nationality, Editor's Name, and Publisher's Name.
55. Name, Address, Nationality, Editor's Name, and Publisher's Name.
56. Name, Address, Nationality, Editor's Name, and Publisher's Name.
57. Name, Address, Nationality, Editor's Name, and Publisher's Name.
58. Name, Address, Nationality, Editor's Name, and Publisher's Name.
59. Name, Address, Nationality, Editor's Name, and Publisher's Name.
60. Name, Address, Nationality, Editor's Name, and Publisher's Name.
61. Name, Address, Nationality, Editor's Name, and Publisher's Name.
62. Name, Address, Nationality, Editor's Name, and Publisher's Name.
63. Name, Address, Nationality, Editor's Name, and Publisher's Name.
64. Name, Address, Nationality, Editor's Name, and Publisher's Name.
65. Name, Address, Nationality, Editor's Name, and Publisher's Name.
66. Name, Address, Nationality, Editor's Name, and Publisher's Name.
67. Name, Address, Nationality, Editor's Name, and Publisher's Name.
68. Name, Address, Nationality, Editor's Name, and Publisher's Name.
69. Name, Address, Nationality, Editor's Name, and Publisher's Name.
70. Name, Address, Nationality, Editor's Name, and Publisher's Name.
71. Name, Address, Nationality, Editor's Name, and Publisher's Name.
72. Name, Address, Nationality, Editor's Name, and Publisher's Name.
73. Name, Address, Nationality, Editor's Name, and Publisher's Name.
74. Name, Address, Nationality, Editor's Name, and Publisher's Name.
75. Name, Address, Nationality, Editor's Name, and Publisher's Name.
76. Name, Address, Nationality, Editor's Name, and Publisher's Name.
77. Name, Address, Nationality, Editor's Name, and Publisher's Name.
78. Name, Address, Nationality, Editor's Name, and Publisher's Name.
79. Name, Address, Nationality, Editor's Name, and Publisher's Name.
80. Name, Address, Nationality, Editor's Name, and Publisher's Name.
81. Name, Address, Nationality, Editor's Name, and Publisher's Name.
82. Name, Address, Nationality, Editor's Name, and Publisher's Name.
83. Name, Address, Nationality, Editor's Name, and Publisher's Name.
84. Name, Address, Nationality, Editor's Name, and Publisher's Name.
85. Name, Address, Nationality, Editor's Name, and Publisher's Name.
86. Name, Address, Nationality, Editor's Name, and Publisher's Name.
87. Name, Address, Nationality, Editor's Name, and Publisher's Name.
88. Name, Address, Nationality, Editor's Name, and Publisher's Name.
89. Name, Address, Nationality, Editor's Name, and Publisher's Name.
90. Name, Address, Nationality, Editor's Name, and Publisher's Name.
91. Name, Address, Nationality, Editor's Name, and Publisher's Name.
92. Name, Address, Nationality, Editor's Name, and Publisher's Name.
93. Name, Address, Nationality, Editor's Name, and Publisher's Name.
94. Name, Address, Nationality, Editor's Name, and Publisher's Name.
95. Name, Address, Nationality, Editor's Name, and Publisher's Name.
96. Name, Address, Nationality, Editor's Name, and Publisher's Name.
97. Name, Address, Nationality, Editor's Name, and Publisher's Name.
98. Name, Address, Nationality, Editor's Name, and Publisher's Name.
99. Name, Address, Nationality, Editor's Name, and Publisher's Name.
100. Name, Address, Nationality, Editor's Name, and Publisher's Name.

I, Dr. R. N. Mista, hereby declare that the particulars given above are true to the best of my knowledge and belief.

Dr. R. N. Mista  
Publisher



**FORM IV**

(See Rule 8)

1. Place of Publication ... 7, Astley Hall, Dehra Dun
2. Periodicity of its Publication ... Quarterly
3. Printer's Name ... Shri T.C. Sharma  
Nationality ... Indian  
Address ... Dun Printing House  
27, Rajpur Road, Dehra Dun
4. Publisher's Name ... Dr. R.N. Misra  
Nationality ... Indian  
Address ... Wildlife Preservation Society of India
5. Editor's Name ... Dr. R.N. Misra  
Nationality ... Indian  
Address ... 7, Astley Hall, Dehra Dun
6. Name of the Printing Press and the true ... Dun Printing House,  
and precise description of the premises. 27, Rajpur Road, Dehra Dun
7. Names and addresses of individuals ... The Wildlife Preservation Society of  
who own the newspaper and India  
partners or shareholders holding 7, Astley Hall, Dehra Dnn  
more than one per cent of the total  
capital.

I, Dr. R.N.Misra, hereby declare that the particulars given above are true to the best of my knowledge and belief.

Sd./- R.N. Misra

*Publisher*



# OSIBISA

Introducing First Time in India

## "THE MIRACLE FOR FOREST NURSERIES"

**PROUDLY PRESENTS EDUCATIONAL VIDEO FILMS ON WILDLIFE  
NATURE AND ENVIRONMENT**

Welcome to the world of "OSIBISA". We hope our magnificent world-acclaimed films will provide you and all with hours of enthralling and **Educational** insights into the natural world.

You might like to know about the "Osibisa Collection" which will bring you Fascinating secrets of the natural and scientific worlds from all over the world which covers all the delightful unravelled Mysteries on the unique private life of mammals, winged world, unloved reptiles and amphibians, wonders of the forests, unrecorded forms of sea life, insight on our earth and planets, unique kaleidoscopic view of the tribes, culture, people and civilisation of different cities, countries and continents, great mountains and rivers, and much more for the human eye to detect.

"Osibisa" also supplies video discs, 16 mm films and projectors, slides and automatic slide projectors, even audio cassettes and records on wildlife.

"Osibisa" has already supplied video films and accessories to different forest departments, forest conservators, colleges and research centres, project tiger, and D.F.O'S of practically all the States of our country.

\* Remember \* there are far more than seven wonders of the world—"Osibisa" video collections proves it. Please contact for our latest brochure.

MOSS

"Osibisa"

"Mewad House" 8, Panchvati Society  
Ambawadi, Ahmedabad-380 006, India

Phone : 444409



# MOSS MIRACLE

Introducing First Time in India

## "THE MIRACLE FOR FOREST NURSERIES"

**IDEAL SEED STARTER :** Soak the seed for 10 Minutes in full Strength Solution of MOSS MIRACLE (1 tablespoon per gallon) and wet seed beds with regular full strength of water, plant seed as usual and sprinkle the solution on the seed beds. After sprouting, feed seedlings again with a weak solution.

**TRANSPLANTING :** MOSS MIRACLE helps prevent transplanting SHOCK. When transplanting dip the roots in strong solution, and after transplanting, apply the left solution as a liquid fertilizer.

**ALL PURPOSE LIQUID FERTILIZER :** MOSS MIRACLE contains vital plant Nutrients specially processed for quick absorption through leaves as well as roots. This fast double-acting method of plant nutrition has been proved by scientists of many major American Universities. **30 Seconds** after applying MOSS MIRACLE to roots of heavy, five foot plants, University scientists have discovered quantities of nutrients in plant tissue from roots through stems to top most leaves. It is this amazing assimilation that helps to produce fast and strong growth.

**DIRECTIONS FOR USAGE :** Mix One teaspoon of MOSS MIRACLE to one gallon of water and just spray the MOSS MIRACLE Solution over the plant until most of the leaves are wet. Then soak the soil around roots just as you would when watering plants. Leaf feeding is recommended for nurseries and outdoor plantations only. Many experts prefer to feed using a very weak solution for regular use. Mix approximately  $\frac{1}{4}$  teaspoon of MOSS MIRACLE to one gallon of water.

**SAFE :** Moss Miracle will not "burn" roots or foliage when mixed with water according to directions. Use it any time, even in hot, dry summer.

### "GUARANTEED ANALYSIS OF MOSS MIRACLE"

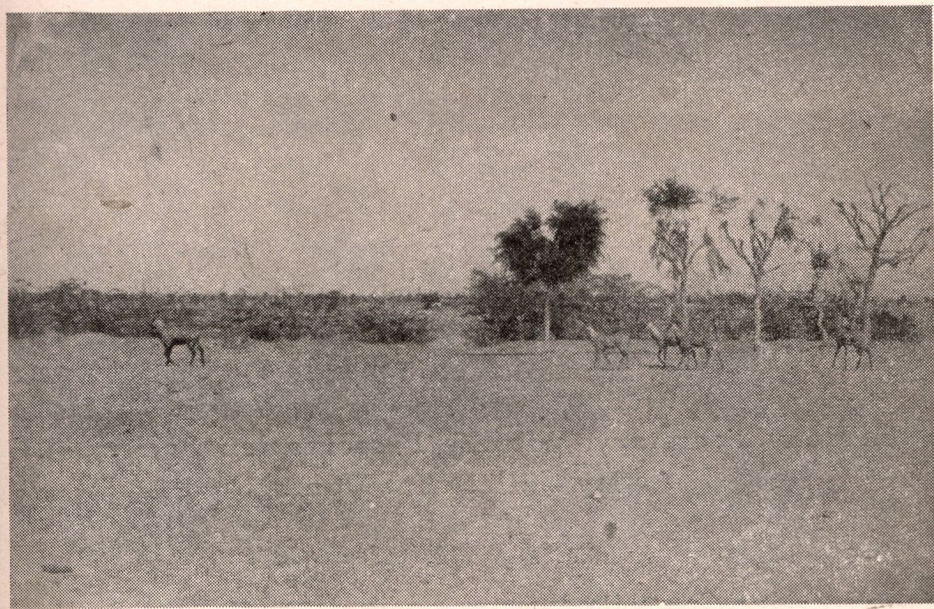
|                                        |     |     |         |
|----------------------------------------|-----|-----|---------|
| Total Nitrogen [N]                     | ... | ... | 15%     |
| 6.8% Ammoniacal Nitrogen               |     |     |         |
| 8.2% Urea Nitrogen                     |     |     |         |
| Available Phosphoric Acid [ $P_2O_5$ ] | ... | ... | 30%     |
| Soluble Potash [ $K_2O$ ]              | ... | ... | 15%     |
| Born [B]                               | ... | ... | 0.02%   |
| Copper [Cu]                            | ... | ... | 0.07%   |
| Iron [Fe] 0.15% Chelated Iron          | ... | ... | 0.15%   |
| Manganese [Mn]                         | ... | ... | 0.15%   |
| Molybdenum [Mo]                        | ... | ... | 0.0005% |
| Zinc [Zn]                              | ... | ... | 0.06%   |

## MOSS

8, Panchvati Society, Ambawadi, Ahmedabad-380 006, India. Phone : 444409

**ROOT HORMONES & GIBBERELIC ACID AVAILABLE AT ROCK BOTTOM PRICE**





Nilgai, *Boselaphus tragocamelus* : All-bull herd-procession towards crop fields at 'Manaklao' (Feb. 4, 1988) — an adult bull followed by two young adults and two subadults.

*For reference see Article on Page No. 10*



**President:**— Col. Pratap Singh Malvendra  
of Nabha

**Delhi Branch**

**President:**—Shri K.P. Sinhdeo

**Head Office :**

**Hony. Secretary:**—Dr. R.N. Misra

**Vice President:**—Shri S.K. Roy

**Treasurer:**—Dr. S. K. Sangal

**Hony. Asstt. Secretary:**—Shri N.K. Gaur

**Vice Presidents**

(1) Shri N.D. Bachkhethi  
I.G. Forests (Retd.)  
7, Astley Hall, Dehra Dun

(2) M.A. Rashid  
103, Ketan Apartment  
Fatehganj Camp  
Vadodara—390002  
(Gujarat)

**Editorial Board**

1. R.N. Misra

2. Dr. S.K. Sangal

3. Shri N.K. Jain

**Buy from: the Hony. Secretary, Wildlife Preservation Society of India  
7, Astley Hall, Dehra Dun.**

|                                                                 | <b>Price</b>      |
|-----------------------------------------------------------------|-------------------|
| (1) Society's Badge—Metal Cheetal Head                          | ... Rs. 6.00 each |
| (2) 'National Parks' by K.S. Sankhala, IFS (Published by WLPSI) | ... 20.00 „       |
| (3) CHEETAL—IUCN Special Souvenir Issue, 1969                   | ... 20.00 „       |
| (4) „ „ „ „ „ 1972                                              | ... 15.00 „       |
| (5) Back Numbers of Cheetal (if available)                      | ... 12.00 „       |